Cruise Report S224

Scientific data collected aboard
SSV *Robert C. Seamans*

Honolulu, HI- San Francisco, CA
22 June 2009 – 19 July 2009

Sea Education Association
Woods Hole, Massachusetts

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Data Description

An extensive oceanographic investigation of the North Pacific Subtropical Gyre was conducted during Sea Education Association's cruise S224, Honolulu, HI to San Francisco, CA (see Figure 1, below). Along this cruise track the SSV *Robert C. Seamans* provided a platform for the following chemical, biological, physical and geological sampling efforts (Table 1):

1. Deep (1000m+) hydrocast/CTD casts measuring temperature, salinity, dissolved oxygen, colored dissolved organic matter, chl-a fluorescence, and discrete sampling for water chemistry (oxygen, chlorophyll a, phosphate): 28 HC/CTD stations (Table 2, Table 9). During daytime deployments, there were coincident measurements of surface photosynthetically active radiation (SPAR), see Table 3.
2. Surface zooplankton net tows, focusing on general zooplankton diversity and distribution: 41 Neuston stations. At 10 of these Neuston stations, synchronous meter nets, towed in the near subsurface (several meters deep), were deployed using the BT winch. (Tables 4, 5).
3. Zooplankton net tows (to depths of 100m+), focusing on pteropod and formanifora distributions: 4 1-meter net tow stations, 1 2-meter net tow station (Table 5).
4. Surface stations measuring temperature, salinity, chlorophyll a, phosphate: 40 surface stations (Table 6)
5. Sediment samples acquired via Shipek, in corroboration with Brad Rosenheim from Tulane University: 6 sediment stations (Table 7).
6. Continuous monitoring and recording of ocean currents in the upper 600m via ADCP
7. Deployment of one ARGO profiling float (Table 8)

As part of SEA's educational program, undergraduates conduct student-designed oceanographic research during the cruise. Project topics spanned, and integrated, the four "classic" disciplines of oceanography: chemistry, biology, physics and geology (Table 9). The samples and data collected were analyzed onboard as part of investigations of the following lines of scientific inquiry:

1. Vertical profiles of pH and DIC as related to pteropod and foraminifera distribution
2. Shallow salinity minima in relation to advection within the North Pacific Subtropical Gyre and possible connection with winter storm intensity
3. Grain size distribution and carbonate source identification of sediments from the Kalohi and Ahuahu channels North and Northwest of Lanai, Hawaii.
4. Vertical profiles of synechococcus in the North Pacific Subtropical Gyre, comparing abundances between the surface mixed layer, thermocline, deep chlorophyll max, and oxygen minimum zone.
5. Surface plastic distribution in the North Pacific Subtropical Gyre
6. Alkalinity, pH and thus DIC variability in relation to the relative abundance of pteropod and foraminifera
7. Bioluminescence in the top 100m in relation to depth of the mix layer, nutrients, chl-a concentrations and zooplankton biomass
8. Examining the frontal boundary between the northern and southern halves of the North Pacific Subtropical gyre in terms of zooplankton abundance and diversity
9. Lunar periodicity of zooplankton and myctophid vertical migration determined using quantitative ADCP techniques

Student research efforts culminated in a written manuscript and poster presentation to the ship's company. These papers are available on request from SEA.

Giora Proskurowski
Chief Scientist S224

Figure 1. Cruise track for the SSV Robert C. Seamans voyage S224.

Plotted from hourly position data. Departed from Honolulu, HI 22Jun09 and arrived San Francisco, CA 19Jul09.

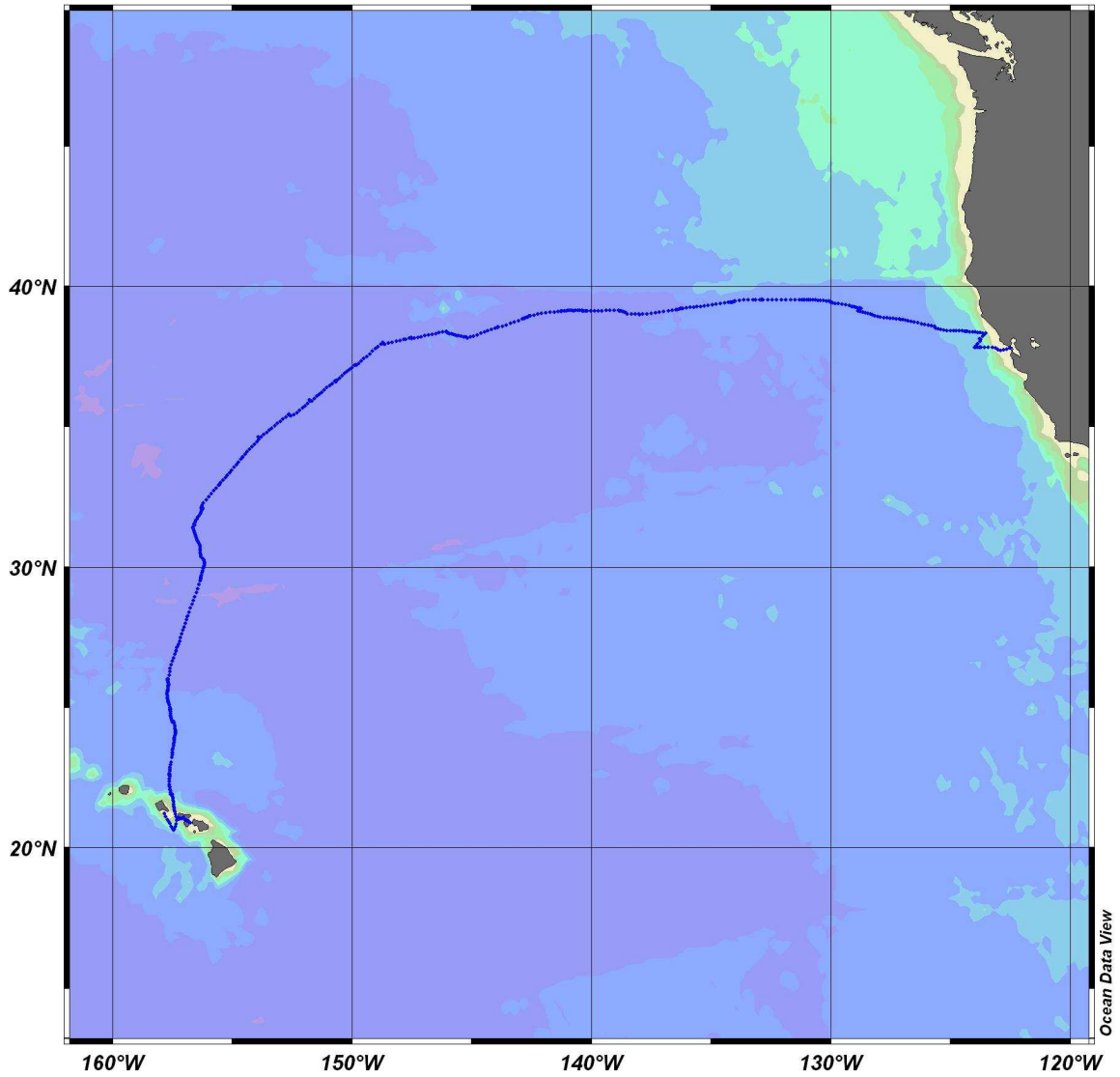


Table 1: Oceanographic Sampling Stations.

HC=hydrocast, CTD= CTD, NT=nueston tow, MN=meter net, SG=Shipek Grab

Station	Date	Time	Log	Latitude	Longitude	Cast Depth	Locale
S224-001-SG	24-Jun-09	0950	104.6	20°59.4' N	156°58.1' W	131	N of Lana'I, Immense
S224-002-SG	24-Jun-09	1105	110.7	20°58.0' N	156°53.0' W	186	N of Lana'I, Giant
S224-003-SG	24-Jun-09	1202	114.8	20°57.1' N	156°50.4' W	58	N of Lana'I, Tiny
S224-004-SG	24-Jun-09	1230	115.9	20°56.2' N	156°50.2' W	98	N of Lana'I, Submarine
S224-005-SG	24-Jun-09	1332	120.1	20°54.1' N	156°47.31' W	68	N of Lana'I, Butterfly
S224-006-SG	24-Jun-09	1400	121.8	20°53.8' N	156°45.74' W	89	N of Lana'I, Bat
S224-007-HC	25-Jun-09	0838	196.9	21°55.4' N	157°31.6' W	834	North Pacific Subtropical Gyre
S224-007-NT	25-Jun-09	1003	198.1	21°54.1' N	157°33.8' W	0	North Pacific Subtropical Gyre
S224-008-NT	25-Jun-09	2215	239.0	22°35.9' N	157°37.2' W	0	North Pacific Subtropical Gyre
S224-009-HC	26-Jun-09	1005	285.0	23°24.3' N	157°29.6' W	1057	North Pacific Subtropical Gyre
S224-009-NT	26-Jun-09	1140	286.5	23°23.0' N	157°30.1' W	0	North Pacific Subtropical Gyre
S224-010-MN	26-Jun-09	2120	316.7	23°54.5' N	157°25.2' W	93	North Pacific Subtropical Gyre
S224-010-NT	26-Jun-09	2224	319.1	23°52.9' N	157°25.5' W	0	North Pacific Subtropical Gyre
S224-011-HC	27-Jun-09	0943	356.2	24°30.1' N	157°27.2' W	912	North Pacific Subtropical Gyre
S224-011-NT	27-Jun-09	1055	357.2	24°28.4' N	157°28.8' W	0	North Pacific Subtropical Gyre
S224-012-NT	27-Jun-09	2135	386.2	24°56.1' N	157°35.6' W	0	North Pacific Subtropical Gyre
S224-013-HC	28-Jun-09	0935	425.3	25°35.9' N	157°41.2' W	1065	North Pacific Subtropical Gyre
S224-013-NT	28-Jun-09	1054	426.2	25°35.2' N	157°41.9' W	0	North Pacific Subtropical Gyre
S224-014-CTD	28-Jun-09	2102	453.3	26°0.4' N	157°42.0' W	395	North Pacific SubTropical Gyre
S224-014-NT	28-Jun-09	2226	454.2	25°59.4' N	157°42.7' W	0	North Pacific Subtropical Gyre
S224-015-HC	29-Jun-09	0822	520.6	27°0.9' N	157°21.24' W	1054	North Pacific Subtropical Gyre
S224-015-NT	29-Jun-09	0944	521.9	27°1.2' N	157°21.3' W	0	North Pacific Subtropical Gyre
S224-016-NT	29-Jun-09	2133	597.6	28°14.8' N	156°52.4' W	0	North Pacific Subtropical Gyre
S224-017-HC	30-Jun-09	0816	676.8	29°35.2' N	156°18.8' W	1002	North Pacific Subtropical Gyre
S224-017-NT	30-Jun-09	0927	677.1	29°36.5' N	156°18.1' W	0	North Pacific Subtropical Gyre
S224-018-NT	30-Jun-09	2100	712.9	30°15.6' N	156°11.4' W	0	North Pacific Subtropical Gyre
S224-018-MN	30-Jun-09	2220	718.9	30°17.0' N	156°13.0' W	128	North Pacific Subtropical Gyre
S224-019-HC	1-Jul-09	0840	753.4	30°53.7' N	156°25.0' W	996	North Pacific Subtropical Gyre
S224-019-NT	1-Jul-09	1005	754.7	30°55.4' N	156°25.9' W	0	North Pacific Subtropical Gyre
S224-019-MN	1-Jul-09	1007	745.7	30°55.4' N	156°25.9' W	~1-3	North Pacific Subtropical Gyre
S224-020-CTD	1-Jul-09	2052	793.9	31°30.8' N	156°33.6' W	411	North Pacific SubTropical Gyre
S224-020-NT	1-Jul-09	2213	794.6	31°30.7' N	156°34.8' W	0	North Pacific Subtropical Gyre
S224-021-HC	2-Jul-09	0855	829.8	32°5.9' N	156°14.0' W	1049	North Pacific Subtropical Gyre
S224-021-NT	2-Jul-09	1015	830.7	32°5.8' N	156°15.2' W	0	North Pacific Subtropical Gyre
S224-021-MN	2-Jul-09	1015	830.7	32°5.8' N	156°15.2' W	7	North Pacific Subtropical Gyre
S224-022-NT	2-Jul-09	2124	893.6	32°57.1' N	155°31.8' W	0	North Pacific Subtropical Gyre
S224-023-HC	3-Jul-09	0938	967.0	33°56.3' N	154°33.1' W	1024	North Pacific Subtropical Gyre
S224-023-NT	3-Jul-09	1054	967.7	33°55.3' N	154°33.9' W	0	North Pacific Subtropical Gyre
S224-023-MN	3-Jul-09	1054	967.7	33°55.3' N	154°33.9' W	7	North Pacific Subtropical Gyre
S224-024-CTD	3-Jul-09	2009	1024.3	34°38.4' N	153°55.5' W	401	North Pacific SubTropical Gyre
S224-024-NT	3-Jul-09	2142	1024.9	34°37.2' N	153°54.6' W	0	North Pacific Subtropical Gyre
S224-025-HC	4-Jul-09	0951	1108.2	35°27.0' N	152°38.3' W	1034	North Pacific Subtropical Gyre
S224-025-NT	4-Jul-09	1141	1109.8	35°24.7' N	152°37.2' W	0	North Pacific Subtropical Gyre

Station	Date	Time	Log	Latitude	Longitude	Cast Depth	Locale
S224-025-MN	4-Jul-09	1141	1109.8	35°24.7' N	152°37.2' W	7	North Pacific Subtropical Gyre
S224-026-MN	4-Jul-09	2150	1171.8	35°56.8' N	151°45.8' W	121	North Pacific Subtropical Gyre
S224-026-NT	4-Jul-09	2250	1173.6	35°55.4' N	151°44.9' W	0	North Pacific Subtropical Gyre
S224-027-HC	5-Jul-09	0951	1246.1	36°38.7' N	150°40.6' W	994	North Pacific Subtropical Gyre
S224-027-NT	5-Jul-09	1111	1246.8	36°37.3' N	150°40.9' W	0	North Pacific Subtropical Gyre
S224-027-MN	5-Jul-09	1111	1246.8	36°37.3' N	150°40.9' W	<7m	North Pacific Subtropical Gyre
S224-028-NT	5-Jul-09	2123	1304.5	37°12.3' N	149°50.5' W	0	North Pacific Subtropical Gyre
S224-029-HC	6-Jul-09	0811	1380.6	37°59.4' N	148°41.8' W	2170	North Pacific Subtropical Gyre
S224-029-NT	6-Jul-09	1052	1381.2	37°57.2' N	148°42.2' W	0	North Pacific Subtropical Gyre
S224-030-CTD	6-Jul-09	2008	1442.6	38°10.1' N	147°31.1' W	411	North Pacific SubTropical Gyre
S224-030-NT	6-Jul-09	2113	1443.1	38°9.3' N	147°31.0' W	0	North Pacific Subtropical Gyre
S224-029-MN	6-Jul-09	0000	1381.2	37°57.2' N	148°42.2' W	4	North Pacific Subtropical Gyre
S224-031-HC	7-Jul-09	0817	1516.4	38°23.2' N	146°4.0' W	1022	North Pacific Subtropical Gyre
S224-031-NT	7-Jul-09	0942	1517.5	38°21.7' N	146°2.7' W	0	North Pacific Subtropical Gyre
S224-031-MN	7-Jul-09	0942	1517.5	38°21.7' N	146°2.7' W	~3-4	North Pacific Subtropical Gyre
S224-032-NT	7-Jul-09	2130	1561.1	38°10.4' N	145°12.1' W	0	North Pacific Subtropical Gyre
S224-033-HC	8-Jul-09	0805	1677.8	38°32.6' N	143°55.3' W	1049	North Pacific Subtropical Gyre
S224-033-NT	8-Jul-09	0924	1628.3	38°32.0' N	143°54.5' W	0	North Pacific Subtropical Gyre
S224-033-MN	8-Jul-09	0924	1628.3	38°32.0' N	143°54.5' W	2	North Pacific Subtropical Gyre
S224-034-MN	8-Jul-09	2221	1694.7	38°55.2' N	142°37.0' W	146	North Pacific Subtropical Gyre
S224-034-NT	8-Jul-09	2321	1696.2	38°56.6' N	142°35.2' W	0	North Pacific Subtropical Gyre
S224-035-HC	9-Jul-09	0815	1760.1	39°6.5' N	141°15.7' W	1048	North Pacific Subtropical Gyre
S224-035-NT	9-Jul-09	0930	1760.5	39°6.5' N	141°14.6' W	0	North Pacific Subtropical Gyre
S224-035-MN	9-Jul-09	0930	1760.5	39°6.5' N	141°14.6' W	1	North Pacific Subtropical Gyre
S224-026-CTD	9-Jul-09	2045	1800.6	39°7.9' N	140°22.7' W	419	North Pacific SubTropical Gyre
S224-036-NT	9-Jul-09	2205	1801.4	39°7.3' N	140°21.4' W	0	North Pacific Subtropical Gyre
S224-037-HC	10-Jul-09	0946	1872.7	39°7.7' N	138°49.9' W	1058	North Pacific Subtropical Gyre
S224-037-NT	10-Jul-09	1118	1873.5	39°7.2' N	138°48.7' W	0	North Pacific Subtropical Gyre
S224-037-MN	10-Jul-09	1118	1873.5	39°7.2' N	138°48.7' W	7	North Pacific Subtropical Gyre
S224-038-CTD	10-Jul-09	2015	1913.8	39°0.7' N	137°60.0' W	605	North Pacific SubTropical Gyre
S224-038-NT	10-Jul-09	2149	1914.2	38°59.7' N	137°59.7' W	0	North Pacific Subtropical Gyre
S224-039-NT	11-Jul-09	0925	1994.7	39°10.9' N	136°19.2' W	0	North Pacific Subtropical Gyre
S224-040-CTD	11-Jul-09	2025	2030.8	39°16.5' N	135°35.4' W	603	North Pacific SubTropical Gyre
S224-040-NT	11-Jul-09	2143	2032.2	39°15.9' N	135°35.5' W	0	North Pacific Subtropical Gyre
S224-041-NT	12-Jul-09	0938	2105.0	39°26.4' N	134°5.3' W	0	North Pacific Subtropical Gyre
S224-042-CTD	12-Jul-09	2008	2164.4	39°31.7' N	132°53.0' W	414	North Pacific SubTropical Gyre
S224-042-NT	12-Jul-09	2126	2164.7	39°30.9' N	132°31.7' W	0	North Pacific Subtropical Gyre
S224-043-NT	13-Jul-09	0927	2246.4	39°31.2' N	131°7.3' W	0	California Current
S224-044-CTD	13-Jul-09	1953	2299.6	39°27.3' N	130°1.6' W	628	California Current
S224-044-MN	13-Jul-09	2104	2300.7	39°26.2' N	130°0.1' W	450	California Current
S224-045-NT	15-Jul-09	0840	2456.8	38°49.1' N	127°5.8' W	0	California Current
S224-046-CTD	15-Jul-09	2042	2526.6	38°31.8' N	125°37.9' W	502	California Current
S224-046-NT	15-Jul-09	2137	2527.2	38°30.6' N	125°37.5' W	0	California Current
S224-047-NT	16-Jul-09	0934	2593.4	38°23.4' N	124°19.7' W	0	California Current
S224-047-CTD	16-Jul-09	2043	2592.4	38°23.7' N	124°21.6' W	607	California Current
S224-048-NT	16-Jul-09	2131	2649.6	38°6.2' N	123°44.9' W	0	California Current
S224-048-CTD	17-Jul-09	2024	2648.9	38°7.0' N	123°46.6' W	621	California Current

Table 2: HC/CTD Station Data.

HC stations have corresponding discrete water samples, see Table 7. NPSG=North Pacific Subtropical Gyre, CC=California Current

Station	Date	Time	Log (nm)	Cast Depth (m)	Locale	Latitude	Longitude
S224-007-HC	25-Jun-09	0838	196.9	834	NPSG	21°55.4' N	157°31.6' W
S224-009-HC	26-Jun-09	1005	285.0	1057	NPSG	23°24.3' N	157°29.6' W
S224-011-HC	27-Jun-09	0943	356.2	912	NPSG	24°30.1' N	157°27.2' W
S224-013-HC	28-Jun-09	0935	425.3	1065	NPSG	25°35.9' N	157°41.2' W
S224-014-CTD	28-Jun-09	2102	453.3	395	NPSG	26°0.4' N	157°42.0' W
S224-015-HC	29-Jun-09	0822	520.6	1054	NPSG	27°0.9' N	157°21.24' W
S224-017-HC	30-Jun-09	0816	676.8	1002	NPSG	29°35.2' N	156°18.8' W
S224-020-CTD	1-Jul-09	2052	793.9	411	NPSG	31°30.8' N	156°33.6' W
S224-019-HC	1-Jul-09	0840	753.4	996	NPSG	30°53.7' N	156°25.0' W
S224-021-HC	2-Jul-09	0855	829.8	1049	NPSG	32°5.9' N	156°14.0' W
S224-024-CTD	3-Jul-09	2009	1024.3	401	NPSG	34°38.4' N	153°55.5' W
S224-023-HC	3-Jul-09	0938	967.0	1024	NPSG	33°56.3' N	154°33.1' W
S224-025-HC	4-Jul-09	0951	1108.2	1034	NPSG	35°27.0' N	152°38.3' W
S224-027-HC	5-Jul-09	0951	1246.1	994	NPSG	36°38.7' N	150°40.6' W
S224-030-CTD	6-Jul-09	2008	1442.6	411	NPSG	38°10.1' N	147°31.1' W
S224-029-HC	6-Jul-09	0811	1380.6	2170	NPSG	37°59.4' N	148°41.8' W
S224-031-HC	7-Jul-09	0817	1516.4	1022	NPSG	38°23.2' N	146°4.0' W
S224-033-HC	8-Jul-09	0805	1677.8	1049	NPSG	38°32.6' N	143°55.3' W
S224-026-CTD	9-Jul-09	2045	1800.6	419	NPSG	39°7.9' N	140°22.7' W
S224-035-HC	9-Jul-09	0815	1760.1	1048	NPSG	39°6.5' N	141°15.7' W
S224-038-CTD	10-Jul-09	2015	1913.8	605	NPSG	39°0.7' N	137°60.0' W
S224-037-HC	10-Jul-09	0946	1872.7	1058	NPSG	39°7.7' N	138°49.9' W
S224-040-CTD	11-Jul-09	2025	2030.8	603	NPSG	39°16.5' N	135°35.4' W
S224-042-CTD	12-Jul-09	2008	2164.4	414	NPSG	39°31.7' N	132°53.0' W
S224-044-CTD	13-Jul-09	1953	2299.6	628	CC	39°27.3' N	130°1.6' W
S224-046-CTD	15-Jul-09	2042	2526.6	502	CC	38°31.8' N	125°37.9' W
S224-047-CTD	16-Jul-09	2043	2592.4	607	CC	38°23.7' N	124°21.6' W
S224-048-CTD	17-Jul-09	2024	2648.9	621	CC	38°7.0' N	123°46.6' W

Table 3: Surface Photosynthetically Active Radiation (SPAR) Data.

Station	Date	Time On	Time Off	Log	Latitude	Longitude	Ave. SPAR (μEinsteins/m^2/sec)	1% light value	1% light depth (m)
S224-009	26-Jun-09	1006	1036	285.0	23°24.3' N	157°29.6' W	2329.5	23.30	101
S224-010	26-Jun-09	2230	2320	316.7	23°54.1' N	157°2.3' W	0.1	0.00	
S224-011	27-Jun-09	1159	1230	359.2	24°27.9' N	157°29.6' W	1597.9	15.98	
S224-013	28-Jun-09	0943	1013	425.3	25°35.9' N	157°41.2' W	2446.4	24.46	107
S224-015	29-Jun-09	0824	0935	521.9	27°1.2' N	157°21.3' W	2281.2	22.81	84
S224-017	30-Jun-09	0933	1049	677.4	29°36.9' N	156°18.2' W	630.7	6.31	119
S224-019	1-Jul-09	0850	0921	753.7	30°53.9' N	156°25.1' W	1705.3	17.05	96
S224-021	2-Jul-09	0909	0935	829.9	32°5.9' N	156°14.1' W	1440.1	14.40	88
S224-023	3-Jul-09	0954	1022	967.1	33°56.1' N	154°33.3' W	2110.2	21.10	89
S224-025	4-Jul-09	0955	1051	1108.2	35°27.0' N	152°38.3' W	1428.2	14.28	94
S224-027	5-Jul-09	1116	1131	1247.0	36°37.1' N	150°40.8' W	1746.1	17.46	80
S224-029	6-Jul-09	0822	0852	1380.6	37°59.2' N	148°41.8' W	1269.2	12.69	71
S224-031	7-Jul-09	0826	0902	1516.4	38°23.1' N	146°3.9' W	632.4	6.32	82
S224-033	8-Jul-09	0811	0907	1627.8	38°32.6' N	143°55.3' W	444.5	4.45	72
S224-035	9-Jul-09	0822	0856	1760.1	39°6.4' N	141°15.6' W	1271.7	12.72	64
S224-037	10-Jul-09	0947	1034	1872.7	39°7.7' N	138°49.8' W	1663.5	16.64	82

Table 4: Neuston Net Data.

Station Locations are as in Table 1.

Station	Tow Area (m^2)	Temp	Salinity (PSU)	Zoo Biomass (ml)	Zoo Density (ml/m2)	Plastic Pieces	Plastic Pelts	Plastic Density (#/km2)	Tar (#)	Halo-bates	Myctop-hids
S224-007	1889	25.3	35.06	4	0.002	14	3	8999	0	8	0
S224-008	1324	25.6	35.06	16	0.012	0	3	2266	0	39	17
S224-009	2521	25.6	35.30	3	0.001	3	12	5951	0	43	0
S224-010	2602	25.6	35.43	11	0.004	20	0	7686	0	83	15
S224-011	2099	25.3	35.50	5	0.002	26	2	13340	0	45	0
S224-012	1667	25.0	35.42	10	0.006	5	0	3000	2	37	5
S224-013	1670	25.1	35.50	7.5	0.004	23	0	13772	0	0	0
S224-014	2715	25.4	35.51	35	0.013	32	1	12155	0	40	0
S224-015	1981	25.2	35.51	53	0.027	500	0	252398	0	41	0
S224-016	2005	26.1	35.57	540	0.269	23	0	11471	0	13	0
S224-017	2143	25.1	35.50	17	0.008	43	0	20065	0	44	0
S224-018	1761	24.9	35.22	20.5	0.012	64	0	36343	0	84	0
S224-019	1474	24.8	35.10	11	0.007	26	3	19674	0	67	0
S224-020	2064	24.6	34.98	21	0.010	28	0	13569	0	280	1
S224-021	1749	24.0	34.57	6	0.003	164	0	93789	0	97	0
S224-022	2547	23.8	34.38	25.5	0.010	45	0	17665	0	135	1
S224-023	1852	23.2	34.26	8	0.004	304	43	187365	3	8	5
S224-024	2010	23.6	34.20	19	0.009	178	2	89575	0	87	1
S224-025	2404	21.6	33.90	4	0.002	427	4	179270	0	14	0
S224-026	2392	21.1	33.88	21	0.009	184	3	78187	0	45	3
S224-027	1896	20.4	33.82	9.25	0.005	339	0	178835	0	6	0
S224-028	2561	20.2	33.46	4.5	0.002	556	3	218274	0	19	0
S224-029	1694	19.9	33.45	7.5	0.004	510	8	305785	0	2	0
S224-030	2040	20.1	33.39	8	0.004	245	1	120600	0	7	2
S224-031	2242	20.2	33.60	3.9	0.002	245	0	109287	0	9	0
S224-032	1958	20.9	33.66	24	0.012	306	0	156298	0	26	7
S224-033	1978	19.3	33.23	741	0.375	384	0	194165	0	0	0
S224-034	1810	19.7	33.35	99	0.055	57	2	32598	0	10	0
S224-035	1593	19.2	33.30	51	0.032	292	1	183930	0	4	0
S224-036	2342	19.4	33.29	151	0.064	180	1	77284	0	0	4
S224-037	2242	19.8	33.48	10	0.004	118	0	52627	0	0	0
S224-038	1880	19.3	33.28	88	0.047	573	0	304787	0	0	0
S224-039	2269	18.7	33.08	91	0.040	390	0	171920	0	0	0
S224-040	1611	19.0	33.10	1601	0.994	108	0	67039	0	0	0
S224-041	1586	18.3	33.14	180	0.113	67	0	42237	0	0	0
S224-042	2668	18.7	33.09	255	0.096	85	0	31861	0	0	8
S224-043	1864	17.8	32.94	11.5	0.006	29	0	15558	0	0	0
S224-045	2471	15.9	32.85	125	0.051	12	0	4856	0	0	0
S224-046	1927	13.0	32.95	278.0	0.144	0	0	0	0	0	190
S224-047	2160	14.0	33.35	272.0	0.126	0	0	0	0	0	0
S224-048	1608	13.6	33.52	512.0	0.318	0	0	0	1	0	197

Table 5: Meter Net Data.

Station Locations are as in Table 1. With the exception of S224-044-2MN, all tows employed a 1m diameter (0.785m^2), 335 µm mesh net. Tow S224-044-2MN was a 1.78m diameter (2.49m^2), 335 µm mesh net

Station	Tow Depth	Tow Volume (m3)	Zoop Biomass (ml)	Zpl Density (ml/m3)	PlasPieces (#)	Plas Pelts (#)
S224-010	93	1697.9	64.0	0.03769	0	0
S224-018	128	1663.3	91.0	0.05471	1	0
S224-019	~1-3	1182.5	8.0	0.00677	151	4
S224-021	7	969.5	N/A	N/A	23	0
S224-023	7	1329.7	N/A	N/A	129	5
S224-025	7	1417.1	N/A	N/A	238	2
S224-026	121	1591.1	54.0	0.03394	3	0
S224-027	<7m	1071.7	N/A	N/A	185	0
S224-029	4	962.6	N/A	N/A	148	14
S224-031	~3-4	1342.2	N/A	N/A	83	0
S224-033	2	1402.2	N/A	N/A	84	0
S224-034	146	1467.2	70.0	0.04771	0	0
S224-035	1	658.5	N/A	N/A	83	0
S224-037	7	1302.9	N/A	N/A	73	0
S224-044-2MN	450	11329.6	581.0	0.05128	0	0

Table 6: Surface Station Data.

Station	Date	Time	Log	Latitude	Longitude	Temp (°C)	Salinity (psu)	PO4 (uM)	Chl-a (ug/l)
S224-SS-001	24-Jun-09	1410	122.3	20°53.8' N	156°46.2' W	25.5	35.09	0.280	0.106
S224-SS-002/007-HC	25-Jun-09	0840	196.9	21°55.4' N	157°31.6' W	25.3	35.06	0.301	0.060
S224-SS-003	25-Jun-09	2225	239.0	22°35.6' N	157°37.3' W	25.6	35.05	0.337	0.066
S224-SS-004/009-HC	26-Jun-09	1020	285.0	23°24.2' N	157°29.7' W	25.6	35.37	0.347	0.078
S224-SS-005	26-Jun-09	2131	316.7	23°54.1' N	157°25.3' W	25.6	35.44	0.327	0.079
S224-SS-006/011-HC	27-Jun-09	1011	356.3	24°29.0' N	157°27.8' W	25.3	35.50	0.240	0.078
S224-SS-007	27-Jun-09	2151	386.7	24°55.8' N	157°35.6' W	25.0	35.42	0.000	0.075
S224-SS-008/013-HC	28-Jun-09	0952	425.3	25°35.8' N	157°41.3' W	25.1	35.49	0.223	0.086
S224-SS-009	28-Jun-09	2230	454.2	25°59.3' N	157°42.7' W	25.4	35.51	0.254	0.080
S224-SS010/015-HC	29-Jun-09	0845	520.6	27°0.8' N	157°21.3' W	25.1	35.51	0.410	0.078
S224-SS-011	29-Jun-09	2310	598.0	28°15.3' N	156°52.2' W	26.1	35.57	0.617	0.071
S224-SS-012/017-HC	30-Jun-09	0820	676.8	29°35.3' N	156°18.8' W	25.1	35.51	0.565	0.072
S224-SS-013	30-Jun-09	2100	713.0	30°15.6' N	156°11.3' W	24.8	35.19	0.607	0.066
S224-SS-014/019-HC	1-Jul-09	0900	753.6	30°54.0' N	156°25.0' W	24.6	34.90	0.332	0.098
S224-SS-015	1-Jul-09	2100	793.9	31°30.7' N	156°33.6' W	24.7	34.90	0.347	0.041
S224-SS-016/021-HC	2-Jul-09	0905	829.8	32°5.9' N	156°14.1' W	24.0	34.55		0.013
S224-SS-017	2-Jul-09	2144	894.3	32°57.2' N	155°31.8' W	23.8	34.38	0.311	0.056
S224-SS-018/023-HC	3-Jul-09	0944	967.0	33°56.2' N	154°33.2' W	23.1	34.24	0.410	0.019
S224-SS-019	3-Jul-09	2155	1025.1	34°37.2' N	153°54.6' W	23.6	34.20	0.617	0.037
S224-SS-020/025-HC	4-Jul-09	1005	1108.2	35°26.3' N	152°38.0' W	21.6	33.89	0.622	0.036
S224-SS-021	4-Jul-09	2150	1171.8	35°55.3' N	151°44.8' W	21.1	33.88		0.054
S224-SS-022/027-HC	5-Jul-09	1005	1246.1	36°38.5' N	150°40.7' W	20.3	33.82	0.659	0.037
S224-SS-023	5-Jul-09	2135	1304.9	37°11.8' N	149°50.4' W	20.1	33.46	0.406	0.055
S224-SS-024/029-HC	6-Jul-09	0822	1300.6	37°59.2' N	148°41.8' W	19.6	33.41	0.333	0.005
S224-SS-025	6-Jul-09	2016	1442.6	33°10.0' N	147°31.1' W	20.1	33.41	0.240	0.047
S224-SS-026/031-HC	7-Jul-09	0844	1516.4	38°22.8' N	146°3.8' W	20.2	33.65	0.323	0.041
S224-SS-027	7-Jul-09	2120	1561.0	38°10.6' N	145°12.5' W	20.9	33.66	0.495	0.063
S224-SS-028/033-HC	8-Jul-09	0817	1627.8	38°32.5' N	143°55.3' W	19.3	33.23	0.610	0.078
S224-SS-029	8-Jul-09	2223	1694.7	38°55.2' N	142°36.9' W	19.7	33.36	0.318	0.058
S224-SS-030/035-HC	9-Jul-09	0827	1760.1	39°6.4' N	141°15.6' W	19.2	33.30	0.396	0.089
S224-SS-031	9-Jul-09	2215	1802.4	39°7.2' N	140°20.8' W	19.5	33.30	0.453	0.062
S224-SS-032/037-HC	10-Jul-09	0947	1872.7	39°7.7' N	138°49.8' W	19.6	33.46	0.552	0.071
S224-SS-033	10-Jul-09	2154	1914.2	38°59.7' N	137°59.6' W	19.6	33.28	0.589	0.056
S224-SS-034	11-Jul-09	0934	1995.0	39°11.1' N	136°18.9' W	18.7	33.08	0.761	
S224-SS-035	11-Jul-09	2150	2032.6	39°15.0' N	135°35.5' W	18.9	33.10	0.584	0.054
S224-SS-036	12-Jul-09	1000	2105.7	39°31.7' N	132°53.0' W	18.3	33.13	0.542	0.076
S224-SS-037	13-Jul-09	2015	2164.4	38°48.9' N	127°3.8' W	18.8	33.09	0.542	
S224-SS-038	15-Jul-09	0915	2458.0	38°48.9' N	127°3.8' W	15.9	32.85	0.464	0.117
S224-SS-039	15-Jul-09	2042	2526.6	38°31.8' N	125°37.9' W	12.8	32.88	0.875	1.038
S224-SS-040	16-Jul-09	0843	2593.4	38°6.8' N	123°46.3' W	13.9	33.35	0.485	1.329

Table 7. Shipek deployment.

Station	Date	Time	Log (nm)	Latitude	Longitude	Depth (m)	Locale	Site Name
S224-001	24-Jun-09	0950	104.6	20°59.4' N	156°58.1' W	131	N of Lana'i	Immense
S224-002	24-Jun-09	1105	110.7	20°58.0' N	156°53.0' W	186	N of Lana'i	Giant
S224-003	24-Jun-09	1202	114.8	20°57.1' N	156°50.4' W	58	N of Lana'i	Tiny
S224-004	24-Jun-09	1230	115.9	20°56.2' N	156°50.2' W	98	N of Lana'i	Submarine
S224-005	24-Jun-09	1332	120.1	20°54.1' N	156°47.3' W	68	N of Lana'i	Buttefly
S224-006	24-Jun-09	1400	121.8	20°53.8' N	156°45.7' W	89	N of Lana'i	Bat

Table 8. ARGO Float deployment.

Float	ID	Date (GMT)	Time (GMT)	Latitude	Longitude
4260	4901047	8-Jul-09	0036	38°16.3' N	145°43.9' W

Table 9. Hydrocast Nisken Bottle Data.

Station	Depth (m)	Temp (deg C)	Salinity (psu)	Density (σ)	O2 (ml/l)	PO4 (uM)	Chl a (ug/l)	pH	TDIC
S224-007-HC	822.315	4.8617	34.432	27.25	0.78	3.501		7.463	
S224-007-HC	819.737	4.9036	34.441	27.25	0.77				
S224-007-HC	694.048	5.5219	34.385	27.13	0.65	3.486		7.707	
S224-007-HC	497.563	7.0045	34.100	26.72	1.84				
S224-007-HC	297.805	11.5732	34.194	26.05	4.44			7.803	
S224-007-HC	199.051	18.4685	34.838	25.04	4.17	0.964		7.871	
S224-007-HC	149.918	21.2237	35.327	24.69	4.60		0.134		
S224-007-HC	99.183	22.0951	35.259	24.39	4.90	0.379	0.162	8.028	
S224-007-HC	73.733	22.3887	35.218	24.28	4.94		0.106		
S224-007-HC	44.814	23.8697	35.012	23.69	4.91	0.527	0.091	8.046	
S224-007-HC	9.164	24.935	35.034	23.39	4.62	0.468	0.078	8.033	
S224-007-HC	2.804	24.9431	35.065	23.39	4.65				
S224-007-HC	0	25.3	35.060			0.507	0.056		
S224-009-HC	991.743	3.8641	34.469	27.39	1.04	3.697		7.492	2308.46
S224-009-HC	892.892	4.2669	34.426	27.31	0.93				
S224-009-HC	743.825	4.8259	34.321	27.16	0.79			7.455	
S224-009-HC	495.669	7.138	34.098	26.7	2.24				
S224-009-HC	396.185	9.2372	34.098	26.38	3.97	1.589		7.783	2592.76
S224-009-HC	228.409	15.8599	34.577	25.46	4.30	0.856			

Station	Depth (m)	Temp (deg C)	Salinity (psu)	Density (σ)	O2 (ml/l)	PO4 (uM)	Chl a (ug/l)	pH	TDIC
S224-009-HC	197.9	17.5	34.753	25.21	4.25		0.047		
S224-009-HC	118.664	21.3643	35.275	24.61	4.64	0.399	0.248	8.099	2188.18
S224-009-HC	72.612	23.0402	35.331	24.18	4.87	0.389	0.122		
S224-009-HC	39.018	24.8981	35.392	23.67	4.69	0.399	0.078	8.112	2356.27
S224-009-HC	3.453	25.3178	35.343	23.5	4.58	0.429	0.058		
S224-009-HC	2.331	25.3159	35.344	23.5	4.59				
S224-009-HC	0	25.6	35.370			0.507	0.074		
S224-011-HC	901.848	3.9875	34.349	27.28	0.63			7.436	
S224-011-HC	793.438	4.3047	34.242	27.16	0.58				
S224-011-HC	595.955	5.7789	34.076	26.86	1.49				
S224-011-HC	396.629	9.3752	34.101	26.36	4.20			7.733	
S224-011-HC	248.899	14.0272	34.337	25.68	4.32				
S224-011-HC	199.385	17.056	34.727	25.3	4.39	0.964		7.931	
S224-011-HC	173.1	19.6	35.194	25.02	4.57		0.081		
S224-011-HC	124.37	20.8059	35.356	24.82	4.80	0.429	0.225	7.931	
S224-011-HC	98.53	21.1467	35.378	24.75	4.89	0.384	0.142		
S224-011-HC	74.28	21.5993	35.329	24.58	4.85	0.556	0.069	8.063	
S224-011-HC	38.642	24.2924	35.526	23.96	4.87	0.778	0.072	8.089	
S224-011-HC	3.145	24.9728	35.474	23.71	4.63				
S224-011-HC	0	25.3	35.490				0.074		
S224-013-HC	992.037	3.7042	34.413	27.36	0.78			5.442	
S224-013-HC	892.589	3.9932	34.354	27.28	0.59			5.645	
S224-013-HC	745.364	4.4806	34.211	27.11	0.49			5.927	
S224-013-HC	500	7.8175	34.016	26.54	3.22			6.683	
S224-013-HC	400	10.1302	34.116	26.25	4.52			7.030	
S224-013-HC	290	13.1998	34.363	25.87	4.70			7.379	
S224-013-HC	200	17.1022	34.708	25.27	4.45	0.483	0.080	7.716	
S224-013-HC	125	20.7708	35.251	24.75	4.94	0.370	0.231	7.927	
S224-013-HC	75	21.9611	35.320	24.48	5.03	0.139	0.104	8.045	
S224-013-HC	40	24.146	35.419	23.92	4.73	0.202	0.052	8.117	
S224-013-HC	20	24.686	35.471	23.79	4.67	0.261	0.073	8.151	
S224-013-HC	3	24.7451	35.462	23.77	4.14				
S224-013-HC	0	25.1	35.490			0.601	0.082	8.201	
S224-015-HC	991.6	3.778	34.393	27.33	0.66	5.236		7.383	2220.80
S224-015-HC	793.2	4.4241	34.220	27.13	0.49				
S224-015-HC	596	5.5122	34.016	26.84	1.70			7.458	
S224-015-HC	495.177	7.0657	34.014	26.64	2.84				
S224-015-HC	396.562	9.3343	34.094	26.36	4.17	1.584		7.716	2146.19
S224-015-HC	297.852	11.6479	34.215	26.05	4.66			7.797	
S224-015-HC	198.422	15.5626	34.512	25.48	4.45	0.881	0.053		
S224-015-HC	144.714	18.8357	35.027	25.09	4.58	0.635	0.163		
S224-015-HC	124.039	19.5838	35.139	24.98	4.80	0.242	0.250	8.014	2097.03
S224-015-HC	99.148	20.2462	35.243	24.89	4.89	0.350	0.164	8.081	
S224-015-HC	49.019	21.8263	35.355	24.54	5.09	0.291	0.092		

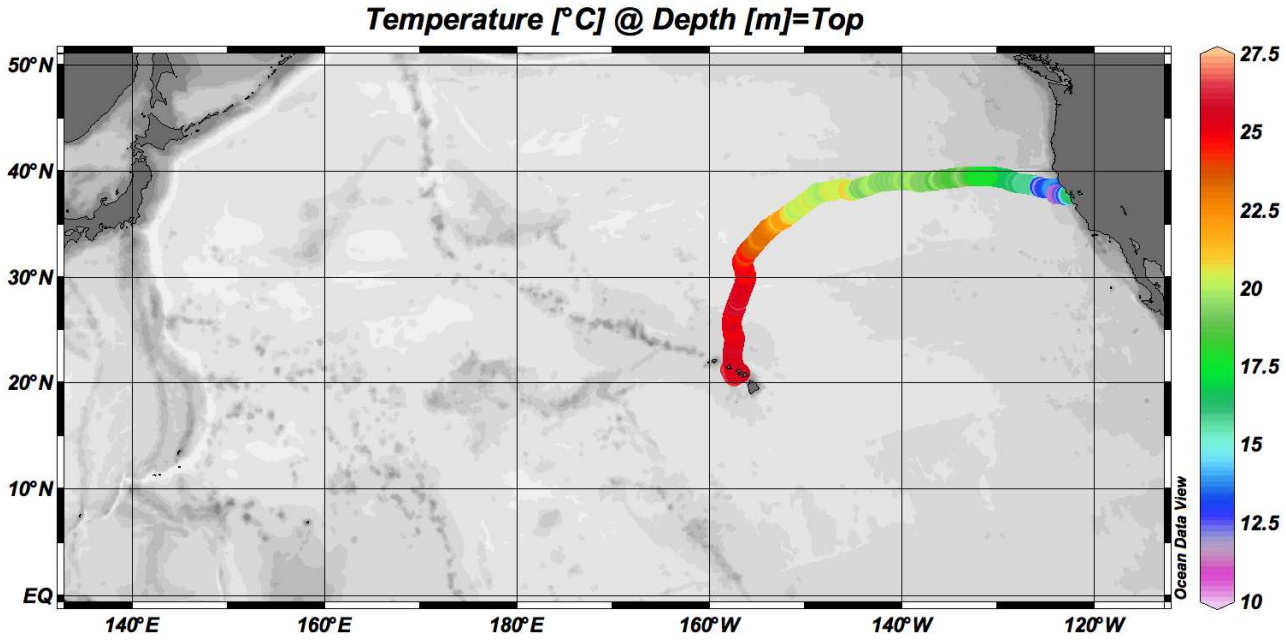
Station	Depth (m)	Temp (deg C)	Salinity (psu)	Density (σ)	O2 (ml/l)	PO4 (uM)	Chl a (ug/l)	pH	TDIC
S224-015-HC	20.5	24.6	35.474	23.82	4.65	0.320		8.084	2245.09
S224-015-HC	0	25.1	35.510			0.301	0.074		
S224-017-HC	991.1	3.68	34.313	27.29	0.29	2.480		7.368	2486.41
S224-017-HC	794	4.35	34.128	27.06	0.71				
S224-017-HC	595.8	6.39	33.992	26.71	2.62			7.546	
S224-017-HC	496.6	8.24	34.040	26.49	3.76				
S224-017-HC	397.6	9.9	34.093	26.26	4.32	0.552		7.795	1991.01
S224-017-HC	298.14	12.39	34.271	25.96	4.65				
S224-017-HC	199	15.71	34.555	25.48	4.48	0.285		7.952	
S224-017-HC	144.1	18.64	34.944	25.0758	5.03		0.157		
S224-017-HC	124.6	19.14	35.039	25.021	4.99	0.397	0.263	8.057	2174.11
S224-017-HC	99	20.23	35.200	24.86	4.95	0.285	0.114		
S224-017-HC	49.8	21.54	35.271	24.55	5.09	0.000	0.072	8.097	
S224-017-HC	20.1	24.6	35.469	23.84	4.68	0.050	0.049	8.090	1974.73
S224-017-HC	0	25.1	35.510			0.022	0.068	8.065	
S224-019-HC	985.67	3.65	34.308	27.28	0.22			7.338	
S224-019-HC	793.14	4.33	34.111	27.05	0.78			7.407	
S224-019-HC	595.28	6.42	33.992	26.71	2.81			7.588	
S224-019-HC	417.6	9.63	34.109	26.33	4.43				
S224-019-HC	297.97	11.69	34.236	26.06	4.70				
S224-019-HC	224.19	13.33	34.332	25.81	4.65				
S224-019-HC	198.85	13.96	34.350	25.7	4.52	0.322	0.024	7.894	
S224-019-HC	148.86	17.15	34.773	25.31	4.63		0.096		
S224-019-HC	124.35	18.58	34.992	25.13	4.82	0.594	0.168	8.029	
S224-019-HC	99.6	19	35.042	25.06	5.02		0.180		
S224-019-HC	49.56	20.44	35.190	24.79	5.19	0.130	0.097	8.072	
S224-019-HC	20.4	24.13	35.097	23.68	4.82	0.139	0.087	8.060	
S224-019-HC	0	24.6	34.900			0.000	0.094	8.059	
S224-021-HC	991.68	3.51	34.286	27.27	0.21	1.373		7.475	2730.33
S224-021-HC	793.72	4.32	34.110	27.05	0.76				
S224-021-HC	596.42	6.04	33.972	26.74	2.49			7.592	
S224-021-HC	496.06	7.63	34.004	26.55	3.60				
S224-021-HC	396.72	9.54	34.109	26.34	4.60	0.346		7.779	2635.70
S224-021-HC	298.19	11.03	34.210	26.16	4.85				
S224-021-HC	198.66	12.68	34.319	25.93	4.81			7.964	
S224-021-HC	144.1	13.52	34.283	25.74	4.89		0.012		
S224-021-HC	124.35	14.18	34.286	25.6	5.01	0.093	0.015	8.052	2922.22
S224-021-HC	99.42	15.6	34.287	25.29	5.50	0.205	0.017		
S224-021-HC	48.76	17.88	34.406	24.85	5.49	0.000	0.033	8.058	
S224-021-HC	19.7	20.27	34.452	24.27	5.30	0.013	0.012	8.012	2356.10
S224-021-HC	0	24.0	34.550			0.000	0.013		
S224-023-HC	991.33	3.4	34.295	29.29	0.19			7.341	
S224-023-HC	793.89	4.13	34.129	27.09	0.79				

Station	Depth (m)	Temp (deg C)	Salinity (psu)	Density (σ)	O2 (ml/l)	PO4 (uM)	Chl a (ug/l)	pH	TDIC
S224-023-HC	596.18	5.52	33.987	26.82	2.28			7.522	
S224-023-HC	396.56	8.56	34.051	26.45	4.30				
S224-023-HC	198.79	11.59	34.263	26.08	4.98			7.800	
S224-023-HC	138.93	12.43	34.199	25.89	4.98	0.238	0.052		
S224-023-HC	114.27	12.81	34.146	25.77	5.08	0.135	0.068		
S224-023-HC	99.1	13.37	33.994	25.54	5.34			7.927	
S224-023-HC	74.08	15.61	34.177	25.2	5.57	0.238	0.050		
S224-023-HC	59.3	16.18	34.120	25.03	5.62				
S224-023-HC	19.55	19.86	34.145	24.15	5.35	0.000	0.055	8.004	
S224-023-HC	10.1	22.8	34.225	23.40	4.86	0.000	0.046	7.986	
S224-023-HC	0	23.1	34.240			0.000	0.019		
S224-025-HC	991.82	3.4278	34.294	27.2882	0.19	1.612		7.386	2340.72
S224-025-HC	793.91	4.0263	34.141	27.1028	0.72				
S224-025-HC	595.09	5.22	33.996	26.8588	1.97				
S224-025-HC	397.18	7.9569	34.011	26.5093	3.91	1.054		7.726	2721.76
S224-025-HC	198.95	11.1545	34.131	26.0755	5.08	0.308			
S224-025-HC	148.76	12.1672	34.100	25.8619	5.04				
S224-025-HC	109.06	13.6195	33.963	25.4678	5.65	0.000	0.059		
S224-025-HC	98.47	14.4045	34.029	25.3544	5.68	0.000	-0.030	8.013	2104.66
S224-025-HC	74.82	15.784	34.072	25.0849	5.62	0.000	-0.004		
S224-025-HC	39.92	17.7433	34.075	24.6277	5.52	0.000	0.021	8.085	
S224-025-HC	19.73	19.818129	33.993	24.0433	5.38				
S224-025-HC	9.9	21.253	33.865	23.56	5.03	0.088	0.008	7.959	2164.53
S224-025-HC	0	21.6	33.890			0.000	0.036	8.018	
S224-027-HC	983	3.38	34.286	27.2861	0.22				
S224-027-HC	743.6	4.23	34.109	27.0596	0.96			7.687	
S224-027-HC	198.2	11.07	34.146	26.1014	5.02			7.847	
S224-027-HC	169.2	11.32	34.101	26.0212	5.00				
S224-027-HC	148.9	11.55	34.065	25.95	5.05	0.226	0.016	7.874	
S224-027-HC	119	12.11	34.014	25.8058	5.07	0.224	0.065	7.911	
S224-027-HC	99.1	12.61	33.942	25.653	5.26				
S224-027-HC	74.5	13.55	33.861	25.4014	5.73				
S224-027-HC	39.2	15.02	33.728	24.9881	5.83				
S224-027-HC	20.4	17.84	33.771	24.3706	5.53	0.000	-0.323	8.009	
S224-027-HC	10.5	19.99	33.799	23.8491	5.12				
S224-027-HC	0.7	20.05	33.803	23.84	5.06				
S224-027-HC	0	20.3	33.820			0.000	0.037	8.011	
S224-029-HC	0	19.6	33.410			0.000	0.005	7.987	2164.10
S224-031-HC	992	3.4345	34.288	27.28	0.21	1.635		7.396	2735.74
S224-031-HC	793.9	3.9449	34.167	27.14	0.54				
S224-031-HC	496.7	6.0011	33.946	26.72	2.64			7.590	
S224-031-HC	348	8.4425	34.018	26.44	4.26				
S224-031-HC	247.9	10.1202	34.102	26.24	4.97				

Station	Depth (m)	Temp (deg C)	Salinity (psu)	Density (σ)	O2 (ml/l)	PO4 (uM)	Chl a (ug/l)	pH	TDIC
S224-031-HC	198.3	10.7396	34.098	26.12	5.00	0.538		7.883	2564.23
S224-031-HC	148.6	11.2435	33.998	25.95	5.13		0.032		
S224-031-HC	99.2	13.0762	33.774	25.43	5.45	0.130	0.222	7.988	2381.69
S224-031-HC	84.4	13.562	33.749	25.31	5.68	0.069	0.174	8.004	
S224-031-HC	74.1	14.2442	33.829	25.23	5.70		0.077	8.027	
S224-031-HC	39.5	15.8919	33.723	24.79	5.66	0.046	0.067	7.980	2342.30
S224-031-HC	20.4	18.7595	33.792	24.16	5.54	0.130	0.066	7.981	
S224-031-HC	0.0	20.2	33.650			0.000	0.041	7.982	2276.29
S224-033-HC	991.424	3.2	34.319	27.33	0.20	2.681			
S224-033-HC	595.984	4.5884	34.036	26.96	0.98				
S224-033-HC	496.4	5.2138	33.950	26.82	1.75				
S224-033-HC	397.2	6.2036	33.917	26.68	2.93	2.086			
S224-033-HC	297.6	7.7103	33.953	26.5	4.01				
S224-033-HC	248.6	8.4955	33.954	26.38	4.49				
S224-033-HC	198.6	9.0734	33.914	26.26	4.82	0.876			
S224-033-HC	149	9.6636	33.733	26.02	5.06	0.707	0.004	7.810	
S224-033-HC	85.7	11.891	33.300	25.29	5.67	0.116	0.318	7.953	
S224-033-HC	43.4	13.9121	33.263	24.86	5.98	0.060	0.001	7.982	
S224-033-HC	20.3	18.7685	33.189	23.7	5.43	0.111	0.100	7.985	
S224-033-HC	10.1	18.8906	33.199	23.67	5.30	0.046	0.055	7.991	
S224-033-HC	0	19.3	33.230			0.041	0.078	7.986	
S224-035-HC	595	4.47	34.046	26.98	1.03				
S224-035-HC	397	5.97	33.917	26.7	2.67			7.477	
S224-035-HC	298	7.47	33.937	26.52	3.87				
S224-035-HC	198	8.86	33.847	26.24	4.75	0.552		7.691	2384.87
S224-035-HC	149	9.45	33.486	25.86	5.02	0.547	0.012		
S224-035-HC	99.5	11.98	33.320	25.29	5.56	0.111	0.333	7.843	2225.76
S224-035-HC	79.6	12.29	33.295	25.21	5.74	0.107	0.496	7.847	
S224-035-HC	59.7	13.0	33.329	25.09	5.91		0.156	7.945	
S224-035-HC	39.5	14.46	33.294	24.77	5.87	0.144	0.096	7.948	2173.22
S224-035-HC	10.5	18.79	33.286	23.76	5.29	0.219	0.088	7.764	
S224-035-HC	0	19.2	33.300			0.435	0.089	7.956	2089.14
S224-037-HC	991.8	3.46	34.328	27.31	0.19			7.359	2515.60
S224-037-HC	793.7	3.89	34.198	27.17	0.36			7.366	
S224-037-HC	595.8	4.54	34.042	26.97	1.20				
S224-037-HC	397.2	6.42	33.916	26.65	2.94			7.573	
S224-037-HC	297.5	8.16	33.961	26.44	4.24				
S224-037-HC	198.7	9.5	33.853	26.14	4.89			7.804	
S224-037-HC	98.9	13.18	33.636	25.3	5.53	0.210	0.233	7.947	2224.23
S224-037-HC	74.6	13.59	33.526	25.14	5.75	0.083	0.142	7.974	2201.47
S224-037-HC	20.2	19	33.448	23.84	5.34	0.093	0.084	7.991	2116.68
S224-037-HC	10.5	19.09	33.440	23.81	5.25	0.050	0.078	7.987	2144.10
S224-037-HC	0	19.6	33.550			0.000	0.071	7.903	2224.31

Figure 2. Plot of surface temperature and surface salinity.

S224 cruise track within the context of the full North Pacific Subtropical Gyre, which extends nearly across the Pacific Basin ~15°N to 45°N.



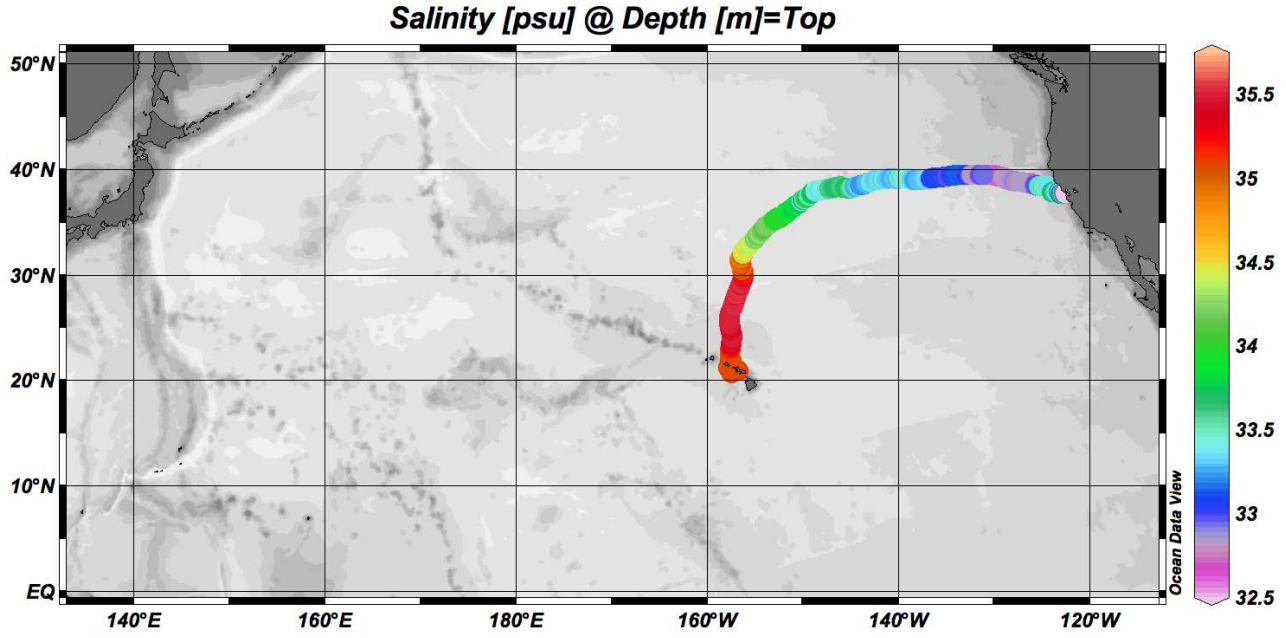


Figure 3. Plot of plastic distribution and wind speed.

Note high concentrations of plastic at ~27‡N corresponding with low wind speeds, and then high concentrations of plastic 32.5°N-38°N and west of ~135°W.

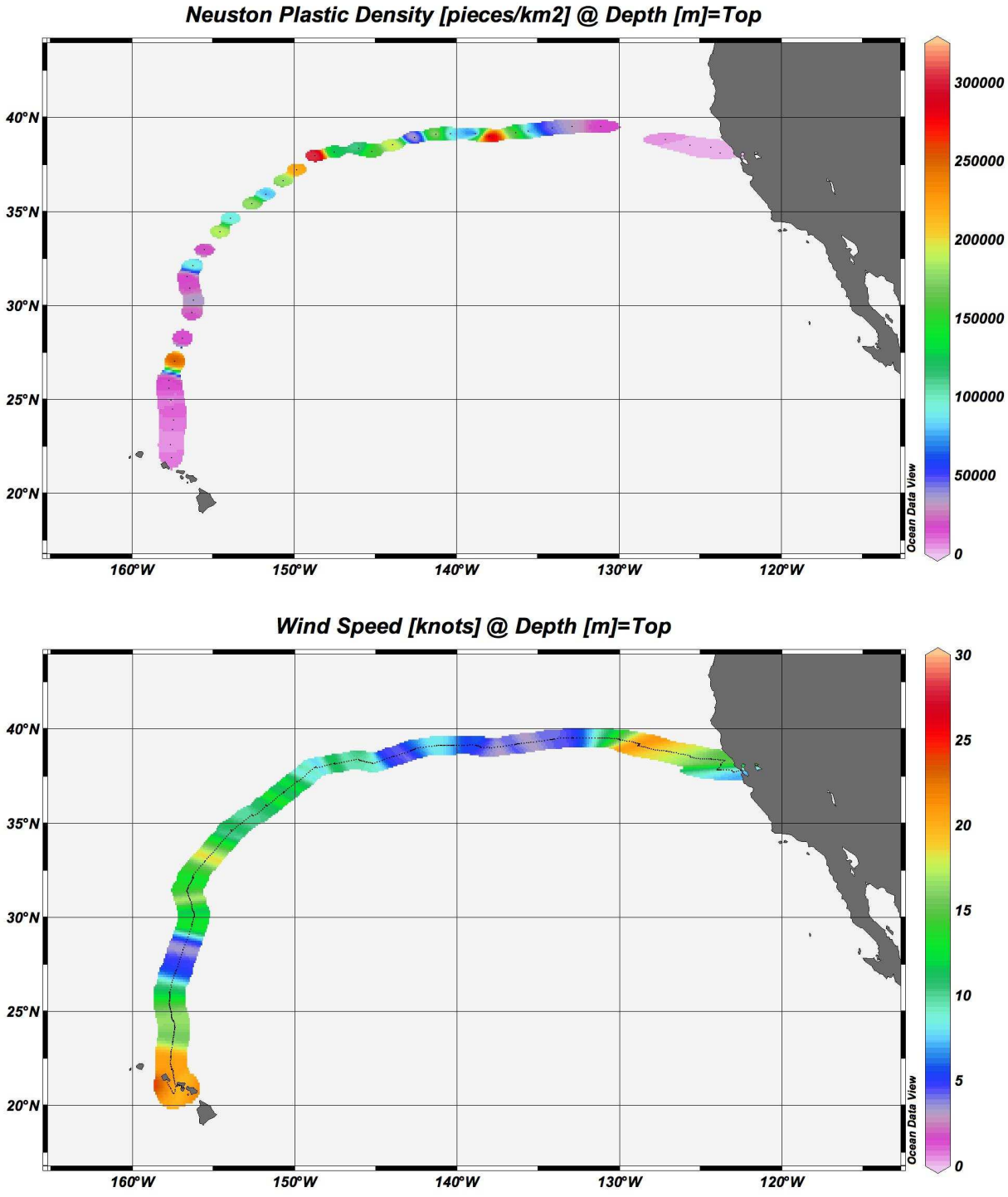


Figure 4. Plot of water column temperature and salinity.

The upper 600m of the North Pacific Subtropical Gyre. Features shown include the two distinct halves of the gyre, Pacific Intermediate Water, and the influence of the California Current.

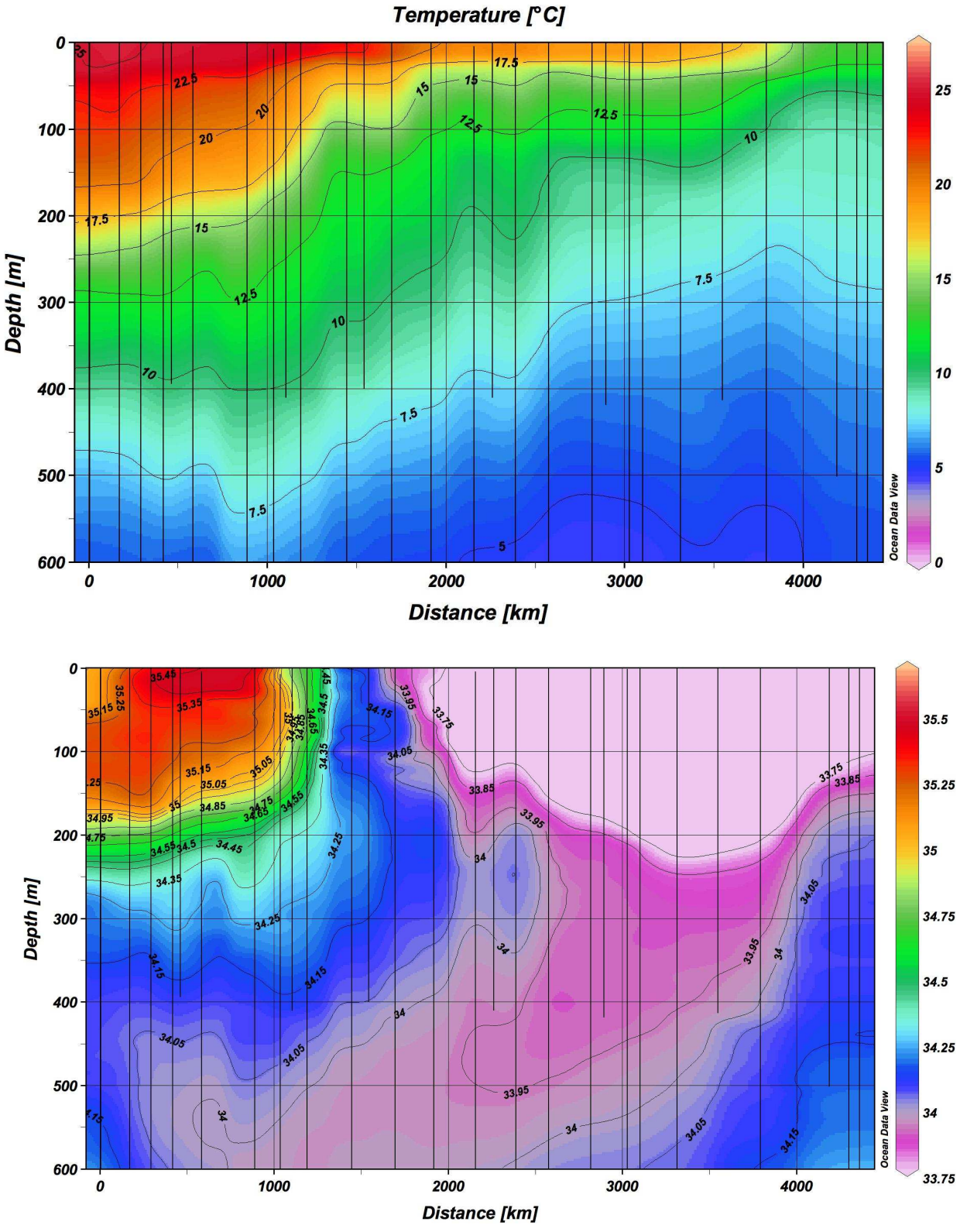


Figure 5. CTD station profile plots along cruise track.

Temperature, salinity, and density profiles articulate mix layer depth, thermocline/pycnocline strength (slope), and the presence of shallow salinity maxima along S224 cruise track.

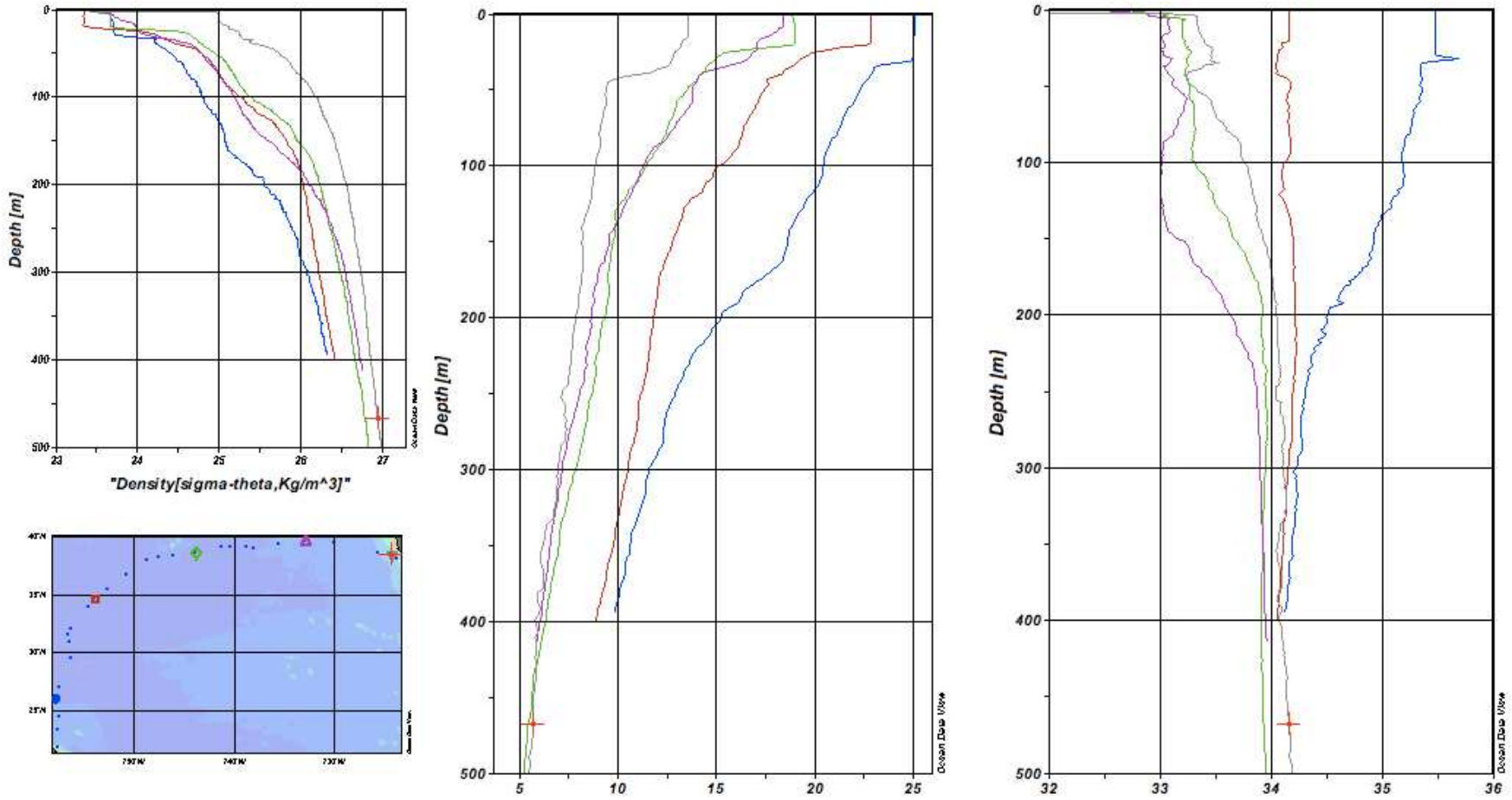


Figure 6. ADCP magnitude data.

Low velocities throughout cruise. Changes in magnitude associated changes in direction, and deflections in the density contours. See Figure 7 for further information.

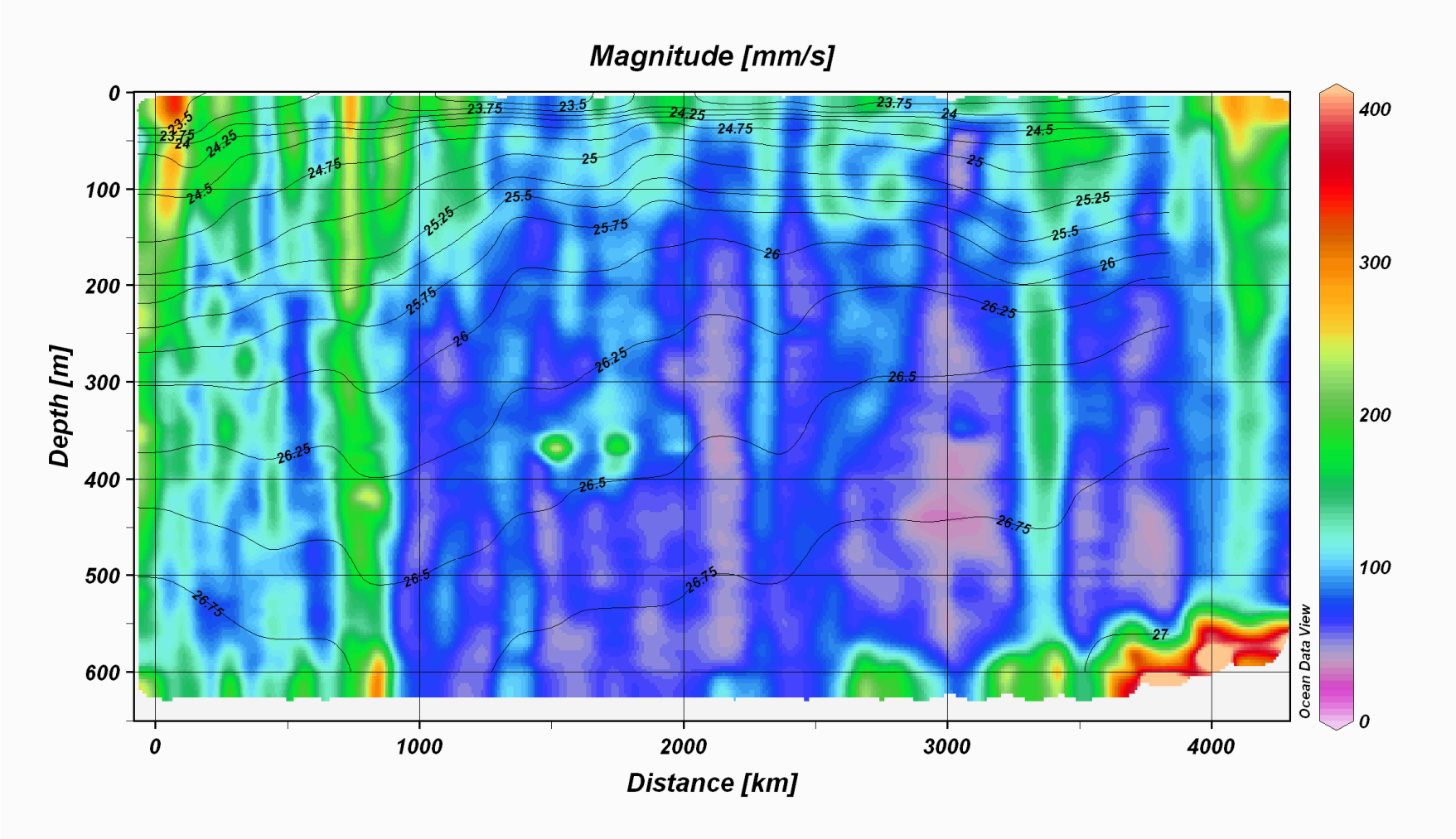


Figure 7. ADCP North component of the velocity, overlain by isopycnals.

Mesoscale eddies at transitions from N to S currents. Note the shoaling of isopycnals associated with southward currents, and deepening of isopycnals associated with northward currents. Similar trends can be observed in plot of East component, where cold currents flow towards the SE, warm currents toward the NW.

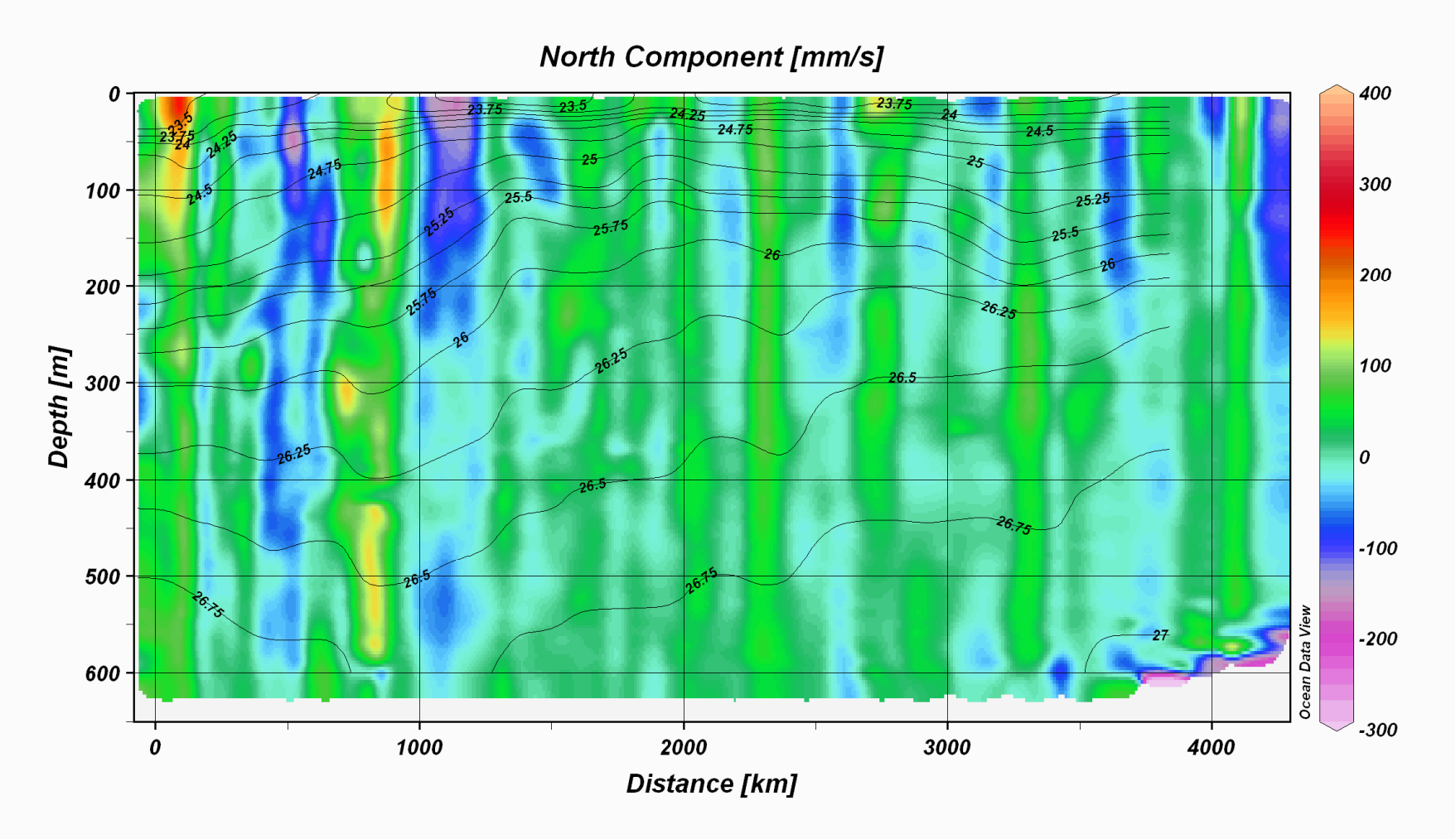


Table 10. Student Research Projects, S224

Diatom Speciation as an Indicator of Climate Change in the North Pacific
John Dow and Zora McGinnis

The effects of DIC on the abundance of Foraminifera and Pteropods
Samantha Bond, Andrew Catherine, Miles Fuller, Leah Nagel, Clara Rowe, and Ian Voorhees

Plastic Ocean: The abundance and distribution of neustonic plastic in the North Pacific
Caroline Callahan, Marina Cassio, Megan Cronin, and Madelyn Sullivan

Lunar periodicity in the diel vertical migrations of myctophid fishes and epipelagic zooplankton in the North Pacific Subtropical Gyre
Alexis Sullivan

Investigation of barrier layers and shallow salinity minima in the North Pacific Sub-Tropical Gyre
Sam Chapman, Jon Fincke, and Melanie Finn

Examining Zooplankton Density trends between the Central Faunal Region and the Eastern Tropical Region
Mike Piersiak and Landes Randall

Composition of Sediment Samples between the Hawaiian Islands of Molokai and Lanai
Zachary Vance

The Effects of pH, Salinity, Chlorophyll-a, the Mixed layer, and the Lunar Cycle on Bioluminescence in the North Pacific Ocean
Talia Dibbell, Kathryn McIntosh, and Jing Zhong

Vertical distribution of Synechococcus in the North Pacific subtropical gyre
Maxwell Cutty, Kimberly Hrycik, and Katherine Rendon

Class photo.